

## First record of the genus *Gomesius* (Hemiptera: Heteroptera: Reduviidae: Emesinae) from India, with description of a new species

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### Abstract

*Gomesius indicus* sp. nov. (Hemiptera: Heteroptera: Reduviidae: Emesinae: Leistarchini), collected in Goa State, India, is described. This is the first record of the genus *Gomesius* Distant, 1903, from India.

**Key words:** Heteroptera, Reduviidae, Emesinae, new species, Indomalaya

### Introduction

A male specimen of an emesine assassin bug (Hemiptera: Heteroptera: Reduviidae) collected in Mollem, Goa, India, was identified as belonging to the genus *Gomesius* Distant, 1903, based on the monograph of Wygodzinsky (1966). This genus has not been recorded from India before (Wygodzinsky 1966, Maldonado Capriles 1990, Ambrose 2006).

Kirkaldy (1901) described the genus *Algol* Kirkaldy, 1901, and its single included species *Algol hesione* Kirkaldy, 1901, based on a male specimen collected in Sumatra. Bergroth (1906) showed that *Algol* was preoccupied, and transferred *A. hesione* to its junior but valid synonym *Gomesius*. Five further species of *Gomesius* have been reported: *G. predatorius* Distant, 1903 (the type species of *Gomesius*), described based on a nymph from Ceylon (=Sri Lanka) (Wygodzinsky 1966) and never recorded subsequently, with the adult still unknown; *G. insaturabilis* Bergroth, 1915, also described from Java (Bergroth 1915) and later considered as a junior synonym of *G. hesione* by Wygodzinsky (1966); *G. bergrothi* Wygodzinsky, 1966 (type locality: Sumatra); *G. lobatus* Wygodzinsky, 1966 (type locality: New Guinea); and *G. uniformis* Wygodzinsky, 1966 (type locality: Sumatra). Thus there are five species included in *Gomesius* at present and none of them has been recorded from India so far. In fact, not much information has been published on the genus after Wygodzinsky (1966); these include brief diagnoses and some illustrations of the widely distributed *G. hesione* with new records from the Ryukyu Archipelago of Japan (Ishikawa & Takai 2003, Ishikawa & Yano 2006) and Taiwan (Rédei & Tsai 2010). The taxonomic history and a list of synonyms of *Gomesius* was given by Wygodzinsky (1966). Maldonado-Capriles (1990) listed the known species, type localities and synonyms. These details are not repeated here.

*Gomesius* is included in the tribe Leistarchini, and is recognized by a prominent penicillate process as the basal element of the posterovental series of spiniform processes of fore femur, which is situated at some distance from its base. In addition the diagnostic characters of the genus include the presence of a small but distinct lateral spiniferous process or spine on external face of fore femur, placed just in front of the penicillate process; fore tarsus being longer than fore tibia, non-segmented; posterior lobe of pronotum being small, not covering mesonotum; and scutellum and metanotum lacking spines (Wygodzinsky 1966).

## Material and methods

A single male bug collected in Goa State, India, was studied under a Leica stereozoom (MZ6) microscope and photographed with an attached Canon Powershot S50 camera. Several images were stacked using Combine ZM software and the images were processed with Adobe Photoshop CS5. Measurements were done with Erma stage and ocular micrometer and an accurate scale. The pygophore was dissected after treating the last three abdominal segments with hot 10% KOH. The detached pygophore was soaked overnight in 5% KOH at room temperature, the phallic complex was dissected, stained with dilute methylene blue before clearing in order to make some parts more clearly visible. The parameres and the phallus were separated in distilled water and mounted in polyvinyl lactophenol (PVLVP) with lignin pink dye, and photographed. The specimen (without pygophore) was briefly treated with dilute acetic acid, washed with 50 and 70% alcohol and then dry mounted.

## Taxonomy

### Subfamily Emesinae

### Tribe Leistarchini Stål, 1863

### Genus *Gomesius* Distant, 1903

*Algol* Kirkaldy, 1901: 54 (junior homonym of *Algol* Sollas, 1888, Spongia; synonymized by Bergroth 1906: 321). Type species by monotypy: *Algol hesione* Kirkaldy, 1901.

*Gomesius* Distant, 1903: 210, 212. Type species by original designation: *Gomesius predatorius* Distant, 1903.

*Isachisme* Kirkaldy, 1904: 280. Unnecessary new name for *Algol* Kirkaldy, 1901.

*Gomesius*: Hsiao & Ren (1981: 395) (redescription); Maldonado Capriles (1990: 101) (catalogue); Putshkov & Putshkov (1996: 158) (catalogue, Palaearctic Region); Wygodzinsky (1966: 117) (redescription, synonyms and key to species); Rédei & Tsai (2010: 16) (diagnosis).

### *Gomesius indicus* sp. nov.

(Figs. 1–25)

**Diagnosis.** *Gomesius indicus* sp. nov. can be differentiated from other congeners by a combination of the following characters: eyes large, reaching ventral outline of head in lateral view; mesonotum with a pair of shining dark brown, round and slightly sunken areas near posterior border; presence of four pairs of tubercles - one pair on each of abdominal sternites four to seven, lack of lobate extensions on connexival margins; laterally and ventrally fully visible eighth abdominal sternite.

**Description.** *Male.* Measurements (in mm). Total length to the tip of abdomen 23. Head length 1.5; length of anteocular portion 0.75; length of postocular portion 0.35; eye diameter measured horizontally in lateral view 0.60; lengths of antennal segments: I: 10.00; II: 6.50; III: 3.25; IV: 4.25; labium: total length 1.82; lengths of labial segments: II (first visible): 0.50; III: 0.50; IV: 0.82; total length of pronotum 3.12; mesonotum 2.50; legs (lengths): fore coxa 4.00; femur 5.30; tibia 1.30; tarsus (including claw) 2.00; middle coxa 0.87; femur 15.0; tibia 17.0; tarsus (including claw) 0.70; hind coxa 0.95; femur 20.5; tibia 25.0; tarsus (including claw) 0.81. Pygophore length 1.60; length from base to parameres 1.50; maximum width at base of parameres 0.87.

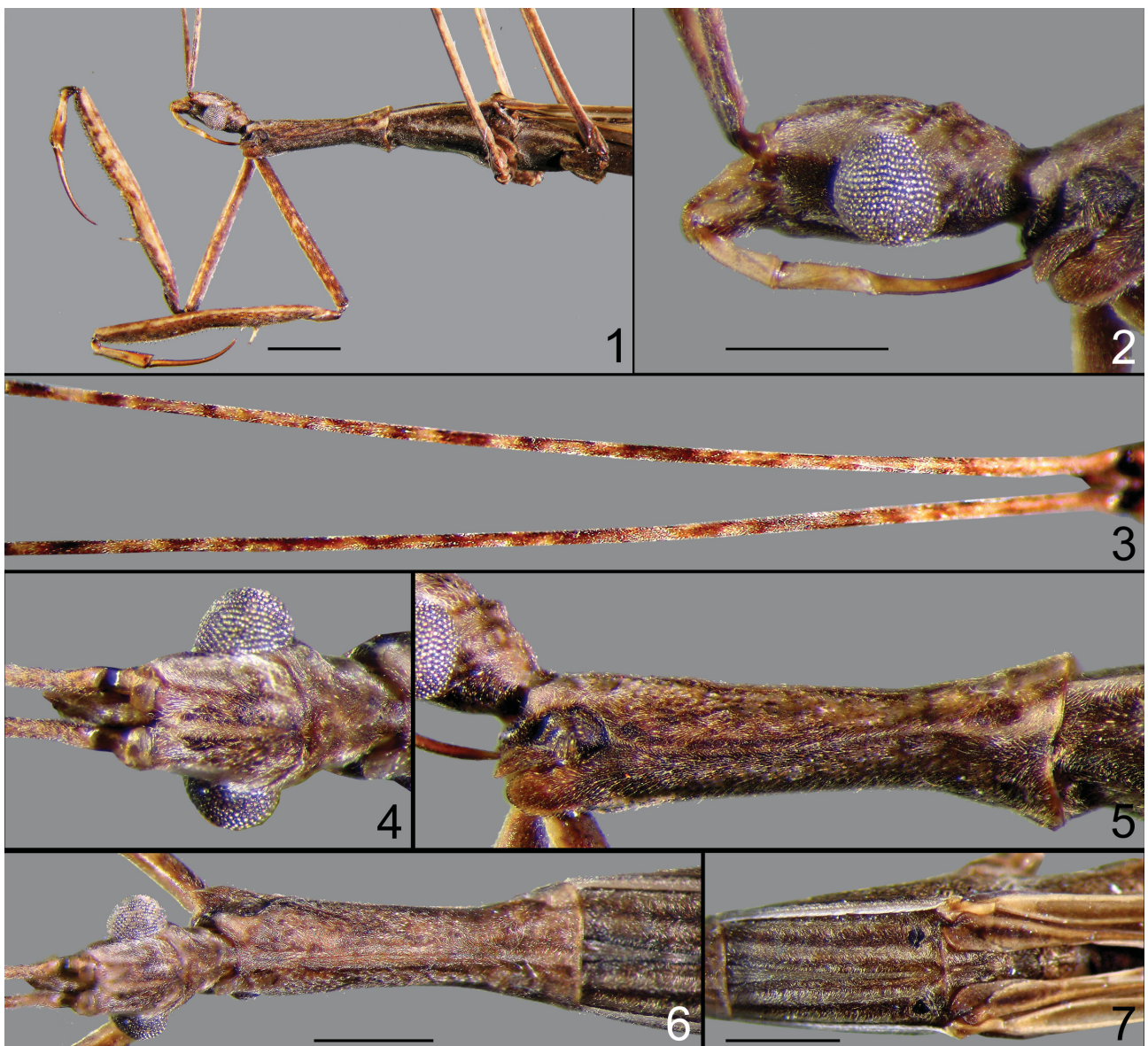
**Color and integument:** Body surface partly dull partly subshining. Body dark brown with a few ochraceous spots or blotches, without any conspicuous pattern; legs more ochraceous with dark brown spots (Fig. 8, 9, 11). Head with a horizontal dark brown stripe across eye laterally (Fig. 2), dorsally with brown blotch centrally, on either side of median pale line of setae, in between eyes (Fig. 4, 6). Antenna dark brown, with irregular ochraceous marking (Fig. 3); second segment mostly ochraceous with a basal, apical and few middle dark annulations, third and fourth segments almost entirely ochraceous, with faint basal and apical brownish spots.

Pronotum darker, with few irregular ochraceous blotches; mesonotum brown, base with a pair of round, dark brown, slightly sunken and shining areas (Figs. 7). Scutellum and metanotum dark brown. Fore coxae and femora with fine dark brown elongate spots on external as well as internal surfaces, those on coxae mostly hidden under

setae; similar elongate dark spots on mid and hind femora in apical portion only (Fig. 1). Mid femora brown with ochraceous markings while hind femora pale brown with indistinct markings; mid tibiae more ochraceous than femora with a few dark brown blotches; hind tibia very pale brown except in apical region where colour is dark; tarsus dark. Forewing pale brown with fuscous blotches or bands along major veins (Fig. 10).

Abdominal tergites brownish with indistinct, median, longitudinal ochraceous line on first four or five segments; sixth to seventh tergites with two median parallel dark brown longitudinal lines. Underside of head, thoracic and abdominal sternites brown; sternites VII, VIII and pygophore very dark brown; median, longitudinal broad ochraceous band present on abdominal sternites VI–VIII and pygophore, this band very prominent on seventh and eighth sternites as well as on pygophore (Figs. 11, 17). Spiracles surrounded by whitish annulus.

**Vestiture:** Entire body clothed with very fine, adpressed, colorless or golden setae. Head dorsally covered with three lines of pale setae; antennal setae mostly fine, short, adpressed, along with few slightly longer erect setae. Pronotum with dense cover of setae, with a median band with more dense setae. Mesonotum with thick, longitudinal lines of setae giving appearance of median and a pair of lateral pale lines. Scutellum and metanotum also with two rows of pale setae. Sternum and abdominal sternites with a cover of fine setae. All legs covered with moderately dense fine setae. Hind tibia with scattered, small, dark spine-like setae.



**FIGURES 1–7. *Gomesius indicus* sp. nov., male holotype.** 1, anterior half of body, lateral view; 2, head, lateral view; 3, antenna, first segment; 4, head, dorsal view; 5, pronotum, lateral view; 6, head and pronotum, dorsal view; 7, mesonotum, scutellum and basal portion of forewings, dorsal view. Scale bars: 1 mm.



**Structure:** Head elongate, more or less fusiform in lateral view, gently rounded dorsally, more or less flat ventrally; anteocular about twice longer than postocular portion, the latter with sides converging posteriorly in dorsal and lateral views. Interocular transverse sulcus or furrow distinct in dorsal view but less so in lateral view, conspicuously backwardly curved but not attaining level of posterior border of eyes, with a pair of small tubercles dorsomedially on posterior border of transverse sulcus (Figs. 2, 4, 6). Eyes large and reaching ventral margin of head. Labium with second (first visible) and third (second visible) segments moderately stout, fourth (third visible) slender and pointed at tip; overall labium straight, not bent between first and second visible segments. First two visible segments of labium subequal in length, third longest; distal tip of first visible segment of labium is in vertical line with antenniferous tubercles above, second visible segment reaches beyond level of anterior border of eye while last segment reaches level of fore coxae. Antennae inserted dorsally at middle of anteocular portion (Fig. 2). Pronotum elongate, subcylindrical, with anterior and posterior one third broader than median narrowed part, with very small but distinct hind lobe, its posterior border not covering mesonotum (Fig. 5, 6). Scutellum and metanotum without spines. Posterior border of prosternum distinctly emarginated (Fig. 12, 13). Forelegs moderately stout and long; fore coxae slender than fore femora; fore femora slightly constricted near middle and widened again distally and then almost subparallel. Each fore femur with posteroventral and anteroventral series of spiniform setae and one stout process on outer surface, slightly in front of penicillate process. Posteroventral series beginning at a distance from base of femur equal to one-third of total length of the article, composed of one basal, elongate, penicillate process followed by a large number of slender spiniform setae inserted on short, wartlike bases (Figs. 8, 9). Anteroventral series beginning distinctly apicad of basal process of posteroventral series, not interrupted but strongly curved at base, consisting exclusively of smaller, slender spiniform setae. Tibia short and stout, about one-fourth length of femur; ventrally with one series of short, adpressed, spiniform setae. Tarsus not segmented, longer than tibia and gently curved. One simple, very small claw only (Figs. 1, 8, 9). Mid and hind legs long; hind femora very long, surpassing apex of abdomen. Claws long and slender. Forewings narrow, not attaining apex of abdomen, leaving about 2.5 mm length of abdomen exposed, with venation as shown in Fig. 10. Abdomen elongate, parallel-sided, more or less widened posteriorly, connexivum moderately broad; posterior angles of connexivum of sixth and seventh segment angularly produced backward (Fig. 11). Abdominal sternites IV–VII with a pair of sublateral protuberances or tubercles near anterior border, those on fifth and sixth prominent than others; distance between two tubercles of same segment about 0.8 mm while distance between tubercles of consecutive segments about 2.0 mm (Fig. 15). Tergite VII rounded at posterior border; sternite VIII visible fully from lateral and ventral side (Figs. 17, 18). Segment VIII and pygophore slightly compressed laterally.

**Male genitalia.** Pygophore elongate, somewhat pear shaped in lateral view (Fig. 18), almost rectangular in dorsal (Figs. 16, 19) and ventral views (Figs. 17, 20); dorsal bridge very short; posterior border of pygophore with broad, apically notably emarginated process, tips of this emargination well-rounded (Figs. 20, 21). Parameres curved, densely setose and only moderately thickened in middle part (Fig. 25). Phallus symmetrical. ArticulATORY apparatus stout. Phallosoma short, subcylindrical, its distal opening somewhat wide. Endosoma with numerous small, dark sclerites dispersed all over (Figs. 22–24).

Female unknown at present.

**Type material. Holotype:** male, **INDIA, Goa**, Mollem, xi.2016, leg. Mirjoy; presently in the private collection of H.V. Ghate, Modern College, and will be deposited in the Zoological Survey of India, Western Regional Station, Pune.

**Etymology.** The specific name is the Latin adjective *indicus*, -a, -um (meaning ‘Indian’, ‘from India’), referring to the fact that this is the first species of *Gomesius* documented from India.

## Discussion

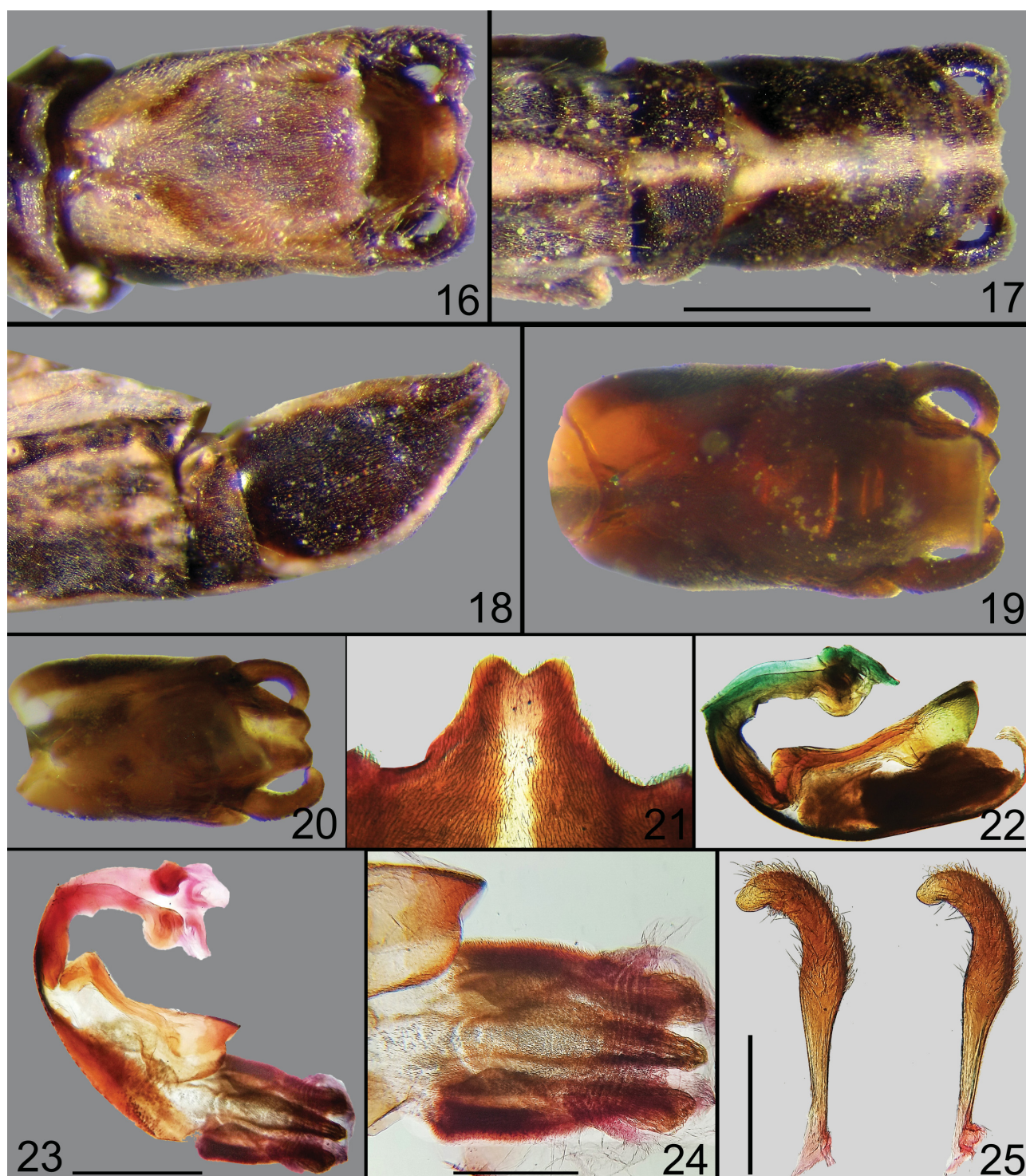
*Gomesius indicus* **sp. nov.** differs from *G. lobatus* in lacking the lobate extensions on connexival segments III–VII, although *G. indicus* **sp. nov.** also has sternite VIII completely exposed as in *G. lobatus*. *G. uniformis* has uniformly dark brown forelegs and forewings while in *G. indicus* **sp. nov.** the legs are brownish or partly dark brown, with a pale ochraceous pattern, and in fore femur the pattern is different on inner and outer face. Like *G. bergrothi*, *G. indicus* **sp. nov.** also shows presence of a pair of small sublateral protuberances / tubercles on some abdominal sternites, but in *G. bergrothi* these are on sternites III–VI, while in *G. indicus* **sp. nov.** on sternites IV–VII. Additionally, in *G. bergrothi* the posterior border of pygophore has the usual long and apically incised or

emarginated process but the incision is very shallow while in *G. indicus* **sp. nov.** the process of the pygophore is short but more deeply and widely incised, with prominent, evenly rounded tips. Also, in *G. bergrothi* sternite VIII is visible only partly on lateral side while in *G. indicus* **sp. nov.** it is fully visible laterally and ventrally; parameres of *G. bergrothi* are also relatively less curved and broader than in *G. indicus* **sp. nov.** Eyes are large in *G. indicus* **sp. nov.** and reach ventral outline of head in lateral view, while in *G. bergrothi* the eyes are smaller and remote from dorsal and ventral margin of the head in both sexes. Eyes are also small in *G. uniformis* and sternite VIII is also completely hidden making it distinct from *G. indicus* **sp. nov.**; the incision on tip of the posterior process of pygophore is relatively shallower in *G. uniformis* than in *G. indicus* **sp. nov.** *Gomesius lobatus* has eyes very similar to that of the new species, but *G. lobatus* is unique in *Gomesius* in possessing lobate extensions on connexivum.



**FIGURES 8–15. *Gomesius indicus* sp. nov., male holotype.** 8, foreleg, lateral view (scale bar 1 mm); 9, fore femur (except basal portion), tibia and tarsus; 10, forewing, dorsal view; 11–14, ventral views; 11, whole body, (scale bar 2 mm); 12, thoracic sternum; 13, prosternum; 14, meso- and metasterna; 15, abdominal sternites, ventrolateral view (scale bar 1 mm), white pointers showing sternal tubercles.





**FIGURES 16–25. *Gomesius indicus* sp. nov., male holotype, genitalia.** 16–20, pygophore and parameres; 16, in situ, dorsal view; 17, same, ventral view (scale bar 1 mm); 18, same, lateral view; 19, detached, dorsal view; 20, same, ventral view; 21, apex of pygophore; 22, phallus, inverted, lateral view (scale bar 0.5 mm); 23, phallus, everted, lateral view; 24, endosoma; 25, parameres (outer view on left, inner view on right).

*Gomesius indicus* sp. nov. cannot be compared with *G. predatorius*, because the latter species is of doubtful identity, with the original description based on a nymph. There is some chance that the two species are conspecific, but as currently there seems no chance to elucidate the identity of *G. predatorius*, we found it the best to describe our specimen from Goa as new. This problem might be solved in the future only if the development of molecular techniques will allow extraction of DNA from the type of *G. predatorius*.

*Gomesius indicus* **sp. nov.** is very similar to *G. hesione* in many characters such as coloration of some areas (e.g. fore femur, last three sternites) and the appearance of pygophore in dorsal view. The ratio of length of pronotum to length of mesonotum is also within the range mentioned by Wygodzinsky (1966); sternite VIII is completely exposed in *G. hesione* as well as in *G. indicus* **sp. nov.**; the length of the unarmed basal portion of the fore femur is one third the length of the femur in *G. hesione* and also in *G. indicus* **sp. nov.** Phallus and parameres as well as the tip of the posterior process of the pygophore of *G. hesione* are however slightly different from the condition found in *G. indicus* **sp. nov.**, as it is evident from the illustrations of Wygodzinsky (1966), but, the endosoma was not everted and the details are not shown and so cannot be compared. The most important distinguishing character of the present species from *G. hesione* is the presence of a pair of sublateral protuberances or tubercles each on abdominal sternites four to seven which were not documented in *G. hesione*, neither in any species of *Gomesius* except in *G. bergrothi*. Another feature not mentioned in any *Gomesius* so far is the presence of a pair of round, shining, dark brown, slightly sunken, areas at the base on mesonotum; these areas are devoid of setae and hence reveal the colour of the integument.

All species of *Gomesius*, a Southeast Asian genus, described so far are from island localities. The presence of a species in western coastal region of India is interesting and a thorough survey of eastern parts of India may reveal its presence in other localities as well.

### A literature-based key to the species of *Gomesius*

- |   |   |                                       |
|---|---|---------------------------------------|
| 1 | Abdominal sternites without small sublateral tubercles .....  | 2                                     |
| - | Abdominal sternites with small sublateral tubercles. ....   | 3                                     |
| 2 | Connexivum without lobate extensions .....  | 4                                     |
| - | Connexivum with lobate extensions .....   | <i>G. lobatus</i> Wygodzinsky, 1966   |
| 3 | Eyes large, reaching ventral border of head in lateral view, sternite VIII of male exposed laterally as well as ventrally ..... |                                       |
|   | .....   | <i>G. indicus</i> <b>sp. nov.</b>     |
| - | Eyes small, remote from ventral and dorsal outlines of head in lateral view, sternite VIII of male exposed only laterally. .... |                                       |
|   | .....   | <i>G. bergrothi</i> Wygodzinsky, 1966 |
| 4 | Color of fore femur uniformly dark brown; sternite VIII of male not visible .....   | <i>G. uniformis</i> Wygodzinsky, 1966 |
| - | Color of fore femur not uniform .....   | <i>G. hesione</i> (Kirkaldy, 1901)    |

(key excludes *G. predatorius* as it was described on the basis of a nymph)

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### References

- Ambrose, D.P. (2006) A checklist of Indian assassin bugs (Insects: Heteroptera: Reduviidae) with taxonomic status, distribution and diagnostic morphological characteristics. *Zoos' Print Journal*, 21 (9), 2388–2406. Available from: <http://www.zoosprint.org/ZooPrintJournal/2006/September/2406sup.pdf> (Accessed 20 July. 2018)
- Bergroth, E. (1906) Zur Kenntnis der Ploeariinen. *Verhandlungender kaiserlich-königlichen zoologisch—botanischen Gesellschaft in Wien*, 56, 305–321.  
<https://doi.org/10.5962/bhl.part.1226>
- Bergroth, E. (1915) Some Javanese Hemiptera collected by E. Jacobson and Th. H. MacGillavry. *Zoologische Mededeelingen*, 21, 109–123.
- Distant, W.L. (1903) *The Fauna of British India, Rhynchota. Vol 2. Part I. Heteroptera*. Taylor and Francis, London, 242 pp.
- Hsiao, T.Y. & Ren, S.Z. (1981) Reduviidae. In: Hsiao, T.Y., Ren, S.Z., Zheng, L.Y., Jing, H.L., Zou, H.G. & Liu, S.L. (Eds.), *A*

- handbook for the determination of the Chinese Hemiptera-Heteroptera. Vol. II.* Science Press, Beijing, pp. 390–538. [in Chinese]
- Ishikawa, T. & Takai, M. (2003) Discovery of an emesine bug *Gomesius hesione* (Heteroptera: Reduviidae) from Japan. *Rostria*, 51, 43–44.
- Ishikawa, T. & Yano, S. (2006) New localities of the reduviid bugs (Heteroptera) in Japan. *Rostria*, 52, 1–20.
- Kirkaldy, G.W. (1901) Six new Reduviidae from Sumatra. *Notes from the Leyden Museum*, 23, 53–57.
- Kirkaldy, G.W. (1904) Bibliographical and nomenclatorial notes on the Hemiptera. No. 3. *Entomologist*, 37, 279–283.  
<https://doi.org/10.5962/bhl.part.2885>
- Maldonado Capriles, J. (1990) Systematic Catalogue of the Reduviidae of the World (Insecta: Heteroptera). *Caribbean Journal of Science*, Special Edition, 1–694.
- Putshkov, P.V. & Putshkov, V.G. (1996) Family Reduviidae Latreille, 1807—assassin-bugs. In: Aukema, B. & Rieger, Chr. (Eds.), *Catalogue of the Heteroptera of the Palaearctic Region. Vol. 2. Cimicomorpha I.* Netherlands Entomological Society, Amsterdam, pp. 148–265.
- Rédei, D. & Tsai, J.F. (2010) A survey of the emesine assassin bugs of the tribes Collartidini, Leistarchini, Emesini, and Metapterini of Taiwan (Hemiptera, Heteroptera, Reduviidae). *Deutsche Entomologische Zeitschrift*, 57 (1), 11–36
- Wygodzinsky, P. (1966) A monograph of the Emesinae (Reduviidae, Hemiptera). *Bulletin of the American Museum of Natural History*, 133, 1–614.